

stations, except at Santa Fé. Rainy weather prevailed from the Northwest to New Mexico and Texas, with very heavy thunderstorms in last. At Indianola the hourly wind-velocity reached, SE. 35 miles. 23d, as it moved northward the central pressure again fell below the normal; NE. gale occurred at Duluth; heavy rains in Texas and Dakota. 24th, light rains were frequent from the Northwest and Upper Lakes to Southwest. On the Texas coast a disturbance developed, which caused heavy rains and northeast gales. 25th, it disappeared into Canada, accompanied over the lakes by rainy weather, occasional thunderstorms and gales; W. 32 miles at Grand Haven, SW. 34 at Port Huron, SW. 35 at Cleveland, and W. 32 at Rochester. The Cautionary Signals ordered for the Texas coast on the 21st were fully justified, but lowered too soon. On the 23rd Signals were also ordered for Lakes Superior, Huron and northern Michigan, but succeeded by gales at Duluth alone; 25th, for Lakes Michigan, (late) Huron and Erie and the New Jersey coast—partly justified. Warnings were despatched mornings of the 23d and 25th for Canadian lake stations.

No. XIV—was a slight depression which appeared off the coast of Nova Scotia on the 23rd, producing light rains thence to Lake Ontario. Maximum velocities: NE. 36 at Father Point, N. 36 at Portland and N. 40 at Boston. Signals were ordered for Eastport, and, on account of a high pressure advancing over the Lake region, for Lake Ontario, the New Jersey and North Carolina coasts. They were only justified at Eastport. Warnings were also sent for St. John's and Halifax.

No. XV—advanced southeastward into Dakota the 25th, with light rains and brisk winds. 26th, the a. m. barometer at Pembina 0.46 below normal. While the central depression moved into Canada, in the barometric trough to the southward over the Gulf States rains were numerous. In the extreme Northwest gales, with rain, occurred; N. 35 miles at Bismarck. 27th, a secondary depression developed and passed eastward north of the St. Lawrence valley during the following day. Rainy weather accompanied it as far south as the Gulf States. Signals ordered for Lake Michigan on the 27th were not justified.

Nos. XVI and XVII.—The former was a slight depression, which produced light rains and occasionally high winds, during its advance over Minnesota and the Lake region; W., 32 miles, at Sandusky. The latter developed over the South Atlantic States. 30th, by midnight they reached Maine as a well-marked depression; barometer at Eastport 29.54, or 0.30 below normal. Rainy weather accompanied them, and northeast gale at Father point. The Signals ordered the 29th for Lakes Michigan and Huron were late and not justified; 30th, for Eastport, followed by SE. gale. The Off-Shore Signals on the 30th from North Carolina to Massachusetts were very generally succeeded by high off-shore winds.

No. XVIII.—The charts of barometric departures from the normals show that a very slight depression crossed Oregon and northern California on the 28th and Utah and Colorado the 29th without producing any precipitation, except at Virginia City. 30th, as it reached Texas the central pressure diminished, and generally light rains were reported from Wyoming and Colorado to Tennessee and Arkansas.

## INTERNATIONAL METEOROLOGY.

On chart No. IV are shown the probable tracks of storm-centres over the oceans, deduced from data received at this office up to May 5th, and in the upper right-hand corner will be found an index to the same. In the upper left-hand corner is a small table giving the approximate wind direction and probable maximum velocities (in miles per hour and meters per second) attending the depressions on the dates named. The following is a brief notice of the same, and also of some storms over the Southern Hemisphere:

*North Atlantic Ocean.*—No. I probably developed slowly, during the 2nd of March, about in the position shown, as a secondary centre to low pressure area No. I of the *March Review*, which latter had probably passed northward on the 1st. No. II is a continuation of No. II low pressure area of *March*, and is only repeated on present chart as it appears probable that during March 5th, a barometric trough extended from its centre far southward over the ocean, in the southern extremity of which storm No. III developed, as shown on present chart. No. IV is a continuation of low pressure area No. VII of *March Review*; it rapidly passed eastward over Newfoundland during the latter part of the 12th, and probably moved southward off the European coast from the 15th to the 18th, although reports are too meagre to determine the position of its centre with much accuracy. On the 19th and 20th, it was probably joined off the Spanish coast by the following area, after which it moved eastward over the Mediterranean. No. V is a continuation of low area No. IX of the *March Review*; it passed eastward over Newfoundland during the night of March 15th, moved eastward until the 18th, thence southward and probably joined the preceding area on the 19th. No. VI developed during the 17th over the Gulf of Mexico, as low area No. X of the *March Review* moved northeastward over the Atlantic States; it passed over the Bermudas on the 19th, and to the southward of Newfoundland on the 20th, after which it has not yet been traced as it was probably not accompanied by high winds. No. VII is a continuation of low area No. XI of the *March Review*: it passed eastward south of Newfoundland on the morning of the 22nd, and having developed increased energy on the 25th, moved southeastward over France to the eastern Mediterranean by the 30th. No. VIII is a continuation of low area No. XIII of the *March Review*; it probably passed eastward to the north of Newfoundland on the 25th, developed increased energy on the 27th, and moved thence to the north of Scotland. No. IX is a continuation of No. XIV of *March Review*; it was felt at the Bermudas on the morning of the 29th, but has not been traced after the 30th. No. X is a continuation of low area No. XVI of *March Review*, and No. I of the present *Review*; this storm-centre arrived off the coast of Ireland on April 5th, and passed thence over central Europe to the Black Sea by the 10th. No. XI developed over the western Mediterranean on April 10th.

and 11th, in rear of the preceding area, and passed northeastward over the Black Sea on the 13th. *South Atlantic Ocean*.—February 7th, 1879, 50° 02' S., 57° 41' W., barometer 29.18, W. by N. fresh gale, rough sea, cloudy; 27th, 47° 32' S., 62° 19' W., barometer 29.19, SSW. fresh gale, rough sea, cloudy. *North Pacific Ocean*.—Three well developed depressions appeared during the latter part of February and first half of March on the east coast of Asia, and the tracks Nos. I, II and III, indicate their general directions, although reports are too meagre to allow them to be considered as anything more than approximations. No. I passed eastward at a short distance north of Zi-Ka-Wei, China, on February 27th; at this place the lowest barometer (29.73) occurred at 2 p. m., and the wind veered from SE. by S. and W. to NW.; total rain-fall 1.39 inches. Nos. II and III probably moved in the directions shown, although there is no data yet to hand to mark the exact positions of their centres. *South Pacific Ocean*.—"January 9th and 10th, 1879, between Feejee Islands and New Hebrides, hurricane with heavy seas." Ship "Othello" reports February 8th, 17° 40' S., 172° E., severe NW. gale increasing at 10 p. m. to hurricane; 9th, 5 a. m., hurricane at its height, wind terrible,—8 a. m., moderated, fearful sea, wind SW.,—noon, moderate but sea very high—4 a. m., (probably should be p. m.,) another gale more violent than before, wind NNE., with thunder and lightning—later, wind S. and high confused sea; 10th, SW. heavy gale, moderating during afternoon." *Indian Ocean*.—"January 20th, 1879, 16° S., 100° E., decks filled with water during heavy SE. gales."

## TEMPERATURE OF THE AIR.

The isothermal lines on chart No. II show the general distribution of the temperature of the air for the month. By a reference to the table of average temperatures upon the same chart it will be seen that for the present month it averages below that for a number of years at Yuma and Tucson, Arizona, in Eastern Gulf States, Florida, Atlantic States, Lower Lake region, St. Lawrence valley and on Mt. Washington. For the remaining districts it has averaged higher than usual, especially from Utah and Northern Arizona northeastward to the Upper Mississippi valley.

*Minimum and Maximum Temperatures*, respectively, are for *Maine*—at Orono, 14° and 64°; Eastport, 16°, 55°; Portland, 23°, 62°. *New Hampshire*—Mount Washington, -7°, 42°; Dunbarton, 18°, 73°. *Vermont*—Newport, 11°, 62°; West Charlotte, 18°, 72°; Burlington, 13°, 68°. *Massachusetts*—Rowe, 14°, 60°; Billerica, 22°, 79°; Boston, 19°, 70°. *Rhode Island*—Fort Adams, 21°, 70°; Newport, 22°, 67°. *Connecticut*—Southington, 19°, 71°; Mystic, 25°, 72°; New Haven, 22°, 71°. *New York*—Madison barracks, 9°, 70°; West Point, 17°, 80°; Plattsburg barracks, 11°, 64°; Albany, 17°, 69°; New York city, 24°, 72°; Rochester, 11°, 75°; Buffalo, 15°, 71°. *New Jersey*—Princeton, 19°, 81°; Vineland, 30°, 83°; Atco, 29°, 84°. *Pennsylvania*—Franklin, 12°, 76°; New Castle, 26°, 84°; Philadelphia, 25°, 80°; Pittsburg, 23°, 82°; Litchfield, 15°, 73°; Catawissa, 23°, 81°. *Delaware*—Dover, 32°, 80°. *Maryland*—Woodstock, 22°, 81°; Emmitsburg, 22°, 83°; Baltimore, 29°, 83°. *District of Columbia*—Washington, 27°, 85°. *Virginia*—Wytheville, 22°, 79°; Accotink, 30°, 87°; Norfolk, 28°, 86°. *West Virginia*—Helvetia, 22°, 80°; Wellsburg, 26°, 88°; Morgantown, 22°, 82°. *North Carolina*—Highlands, 20°, 72°; Weldon, 34°, 88°; Greensboro, 32°, 80°. *South Carolina*—Aiken, 35°, 85°; Charleston, 39°, 81°. *Georgia*—Forsyth, 34°, 84°; Quitman, 36°, 86°; Augusta, 34°, 85°. *Florida*—Milton, 24°, 76°; Houston, 32°, 92°; Jacksonville, 39°, 88°. *Alabama*—Green Springs, 30°, 81°; Montgomery, 36°, 87°; Mobile, 40°, 86°. *Mississippi*—Brook Haven, 36°, 79°; Fayette, 38°, 82°; Vicksburg, 39°, 83°. *Louisiana*—Okalooska, 36°, 85°; Shreveport, 44°, 85°; New Orleans, 46°, 85°. *Texas*—Concho, 35°, 97°; Eagle Pass, 46°, 100°; Denison, 40°, 85°; Austin, 50°, 85°; Uvalde, 37°, 98°; Galveston, 56°, 82°; Corsicana, 37°, 87°; Indianola, 52°, 89°; El Paso, 31°, 98°. *Ohio*—North Lewisburg, 14°, 81°; Jacksonburg, 19°, 90°; Columbus, 18°, 82°; Cincinnati, 23°, 82°. *Kentucky*—Bowling Green, 28°, 85°; Louisville, 26°, 84°. *Tennessee*—Knoxville, 24°, 87°; Memphis, 36°, 85°; Austin, 32°, 84°. *Arkansas*—Mt. Ida, 28°, 82°. *Michigan*—Alpena, 5°, 66°; Marquette, 12°, 80°; Nirvana, 19°, 87°; Detroit, 21°, 76°. *Indiana*—New Corydon, 16°, 81°; St. Meinrad, 27°, 85°; Indianapolis, 21°, 82°. *Illinois*—Riley, 8°, 84°; Sterling, 22°, 88°; Chicago, 17°, 80°; Cairo, 29°, 83°. *Missouri*—Pierce City, 14°, 87°; Kansas City, 14°, 89°; St. Louis, 25°, 83°. *Kansas*—Topeka, 10°, 86°; Independence, 26°, 90°; Dodge City, 19°, 87°. *Iowa*—Logan, 12°, 78°; Guttenburg, 18°, 88°; Des Moines, 17°, 84°. *Nebraska*—Plattsmouth, 12°, 80°; Fort McPherson, 14°, 85°; Fort Hartsuff, 9°, 81°. *Indian Territory*—Fort Sill and Fort Gibson, 31°, 84°. *Minnesota*—Duluth, 7°, 69°; Breckenridge, 4°, 77°; St. Paul, 13°, 81°. *Dakota*—Olivet, 9°, 82°; Deadwood, 20°, 71°; Bismarck, 11°, 75°; Pembina, -10°, 75°; Yankton, 7°, 80°; Morrilstown, 20°, 82°. *Colorado*—Pike's Peak, -10°, 37°; Ft. Lyon, 25°, 84°; Denver, 28°, 76°; Ft. Garland, 15°, 74°; Colorado Springs, 24°, 71°. *New Mexico*—Ft. Union, 21°, 80°; Santa Fé, 23°, 84°. *Wyoming Territory*—Cheyenne, 22°, 72°; Ft. Fred. Steele, 17°, 76°. *Utah*—Promontory, 25°, 78°; Ogden, 36°, 83°; Ft. Douglass, 28°, 70°; Salt Lake City, 30°, 74°. *Nevada*—Tecoma, 16°, 80°; Winnemucca, 26°, 77°; Pioche, 26°, 90°; Camp Halleck, 29°, 83°. *Arizona*—Yuma, 48°, 103°; Tucson, 39°, 97°. *Idaho*—Boise City, 32°, 80°. *Montana*—Virginia City, 18°, 66°. *California*—San Francisco, 46°, 76°; Los Angeles, 42°, 88°; Summit, 20°, 55°; Red Bluff, 40°, 87°; Visalia, 40°, 89°; Campo, 26°, 90°; Indio, 50°, 109°; Mammoth Tank, 52°, 108°. *Oregon*—Portland, 35°, 77°; Roseburg, 32°, 75°. *Washington Territory*—Olympia, 32°, 64°.

*Ranges of Temperature*.—The monthly ranges will appear from an examination of the minimum and maximum just given. Greatest daily ranges vary in New England from 18° at Wood's Holl and summit of Mt. Washington to 34° at Springfield; Middle Atlantic States, 25° at New York City to 43° at Lynchburg; South Atlantic States, 21° at Cape Lookout to 35° at Augusta; Eastern Gulf States, 15° at Key West to